

A NEW HYLID FROG FROM AUSTRALIA

by HAROLD G. COGGER

(Plate XII & Text-figure 1.)

In the early part of 1965 the author received a fine series of living frogs from Mrs. N. Morris of Cairns, Queensland. All specimens were collected in the Cairns district or immediate hinterland. Included in this collection were several specimens of an undescribed frog possessing an arciferal pectoral girdle, broadly expanded sacral diapophyses and intercalary cartilages—a combination of characters found only in the family Hylidae. It is a member of the genus *Hyla* as defined by Goin (1961) and is the smallest species of this genus so far recorded from Australia. Upon comparing these specimens with all of the species of hylid frogs currently recognised from Australia and New Guinea there seemed little doubt that they represented an undescribed species. The only species showing any potential affinity with these Cairns specimens was *Hyla dorsalis* (Macleay), a diminutive species described in 1878 from Papua. However, the type of *Hyla dorsalis* was lost more than 50 years ago and the original description is brief and undiagnostic. Up to the present time the recognition of *Hyla dorsalis* has rested on a single specimen collected in 1955 and identified as this species by Loveridge (1956). Although the specimens from Cairns differed significantly from Macleay's description of *Litoria dorsalis* and from Loveridge's description of his specimen, the latter has been examined and found to be closely allied to the Cairns material.

In the following section the status of *Hyla dorsalis* (Macleay) is briefly discussed. As a result of this discussion the species is redescribed and recorded from Australia for the first time. A new Australian subspecies is described. In the following descriptions the standard measurements for tibia length (TL), eye-naris distance (E-N), internarial distance (IN) and diameter of tympanum follow the methods established by Zweifel (1962).

THE STATUS OF *HYLA DORSALIS* (MACLEAY)

Macleay (1878) described *Litoria dorsalis* from a single specimen from Katow, on the southern coast of New Guinea. Katow was located on what is now known as the Binaturi River, a small river on the mainland almost opposite the island of Daru on the south-western coast of the Territory of Papua. Macleay's brief description reads as follows: "Elongate. Snout pointed. Mouth opening beneath. Nostrils in a lateral depression, close to the snout. Fingers and toes with a well-defined roundish disk, the toes webbed only at the base. Tongue not notched behind. Vomerine teeth in two very oblique short series, with the internal nostril on each side large and oval. Skin of back smooth, of belly granular. Colour, above, dark with a broad central whitish band from the snout to the anus, beneath yellowish, much clouded with brown on the throat and chest. Length of body, 9; width, 2½; length of legs, 16 lines. One specimen from Katow, probably immature."

Fry (1913), in a review of Macleay's New Guinea frog types, stated that he was unable to locate the type of *Litoria dorsalis* and he presumed that the specimen was lost. A further search in the Macleay Museum and the Australian Museum by the author has confirmed, beyond reasonable doubt, the loss of the type. Fry then went on to state that "... Macleay's description is unintelligible. From the fact that the toes are webbed only at the base it is obviously not a *Hyla*. The "mouth opening beneath" and the presence of discs to the fingers suggests that it belongs to some disked Engystomatid genus,

while the latter character, coupled with a basal web to the toes, points to *Cornufer* affinities. I can find no description which could reasonably be said to tally with Macleay's generalised characters. Taking these facts into account, the most satisfactory procedure will be to totally ignore the name *Litoria dorsalis*, Macleay, and to exclude it from future literature."

Although one sympathises with Fry in his frustrating attempts to clarify the status of Macleay's frog types, his total rejection of *Litoria dorsalis*, simply on the basis of its failure to correspond to any other known hylid species, was unwarranted. Subsequently van Kampen (1923) doubtfully included *Hyla dorsalis* in his list of Indo-Australian hylid frogs.

The status of the species thus remained unchanged until Loveridge (1956) obtained a single specimen of a small hylid frog from the Aramia River, Papua. This specimen, which was collected by K. R. Slater in 1955, proved to be a gravid female although only 20 mm. in length. On the basis of its small size at maturity and its close correspondence with Macleay's description of *Litoria dorsalis* Loveridge considered that his specimen represented the rediscovery of Macleay's species.

The specimens from Cairns, Queensland, with which this paper is largely concerned, represent a new addition to the frog fauna of Australia. In morphology they closely resemble Loveridge's Aramia River specimen and another specimen of a small hylid frog collected by the author at Lake Murray, Papua, in 1963. Although differences between the Papuan and Australian specimens are of such an order as to possibly justify the erection of a new species to accommodate the Australian material, as specimens from the two areas show a close affinity which is not shared with any other species from either region, the author believes that such affinity (and its zoogeographic implications) would be obscured by making the Australian specimens a distinct species. Until such time as additional material from both Papua and Australia will permit a more accurate analysis of relationships, the author believes that the most satisfactory means of indicating presumed affinities is to establish a subspecific relationship between the Australian and Papuan populations. However this decision raises a taxonomic problem and necessitates a reassessment of the status of the Papuan species represented by Loveridge's Aramia River specimen.

In the interest of nomenclatural stability it was initially proposed to designate this specimen as neotype of *Litoria dorsalis* Macleay. While aware of the requirements and recommendations, including the "exceptional circumstances" clause, of Article 75 of the 1961 International Code of Zoological Nomenclature, it was felt that the present situation would justify such an action. However in accordance with Recommendation 75A the author contacted Mr. M. J. Tyler of the South Australian Museum for his views on such a procedure. Mr. Tyler, who is currently revising the hylid frogs of New Guinea, disagreed with this neotype proposal and expressed the view that inconsistencies between Loveridge's specimen and Macleay's description of *Litoria dorsalis* preclude the possibility that the two are conspecific.

In the light of these views it would be wrong to formally associate the name *dorsalis* with Loveridge's specimen by making the latter a neotype. Nevertheless as the author considers that there is no valid reason for rejecting Loveridge's action, a brief redescription of *Hyla dorsalis* (Macleay) based on the specimens from the Aramia River and Lake Murray is given in the following section. The reasons for supporting Loveridge's action are as follows:—An examination of Loveridge's Aramia River specimen reveals no features inconsistent with Macleay's description of *Litoria dorsalis*. In all specimens examined there is a broad, light coloured vertebral band which, contrary to the contention of Loveridge (*loc. cit.*) is not inconsistent with Macleay's description of "a broad, central whitish band" in the Katow holotype. Although Loveridge does not mention the condition of the vomerine teeth, his specimen has two small, but prominent, round vomerine elevations between the relatively large choanae.

Macleay stated that the type of *Litoria dorsalis*, which was 9 lines (19 mm.) long, was "probably immature," whereas Loveridge's 20 mm. specimen is a gravid female. In view of the fact that the present material represents the smallest hylid frog known from the Australian region, any opinion not based on dissection (which would have established whether the type was or was not sexually mature) would surely have tended to be that such a small animal was "probably immature."

Only in the extent of the webbing between the toes does there appear to be any lack of agreement between the specimens available and Macleay's description, but even in this the difference is more apparent than real. In all specimens the webbing between the toes scarcely reaches beyond the distal subarticular tubercle of any digit. The difficulties inherent in attempting to define, quantitatively, the extent of webbing between the toes of frogs are stressed by Peters (1964). The term "basal webbing" is ill-defined even today, yet one must consider it within the context of the uncritical work and brief descriptions of Macleay. In the living specimen illustrated in Plate xii, fig. a, the webbing does not extend distally as far as the visible parts of the hind foot. In life, and in some of the preserved specimens here discussed, the webbing could reasonably be defined as basal.

As the type of *Litoria dorsalis* has been lost then the literal accuracy of Macleay's description must be accepted; one should not be concerned with his omissions. But as the type is lost and the original description is brief and not diagnostic, there must always remain some uncertainty as to the true identity of *dorsalis*. Nevertheless if the original description, though incomplete, fits a known but otherwise undescribed taxon then it is felt that the best interests of taxonomy are served by associating the two. To erect yet another name for the material on hand is not only unnecessary in these circumstances but would simply perpetuate a *nomen dubium* in future literature. Therefore on the weight of evidence available to the author there appears to be no sound reason for rejecting at this time the conspecificity of *Litoria dorsalis* and Loveridge's Aramia River specimen. Whether this view will be upheld in subsequent discussions and investigations by other workers remains to be seen. However it is believed that future settlement of the status of *Litoria dorsalis* can only be assisted, and in no way complicated or hindered, by the actions taken in this paper.

REDESCRIPTION OF *HYLA DORSALIS* MACLEAY

The following description is based on specimen No. 28389, a female, in the collection of the Museum of Comparative Zoology at Harvard University, from the Aramia River, Papua and on specimen No. R24248, a female, in the Australian Museum, Sydney, from Lake Murray, Papua. Dimensions of these specimens are given in Table 1.

Diagnosis: *Hyla dorsalis* may be distinguished from all other members of its genus in the Australasian region by the following combination of characters: small size at maturity (17 mm. for males, 20 mm. for females); fingers free of webbing; toes half webbed or less; one to several low, rounded tubercles over each eye. An additional regional diagnosis for Australian specimens is provided in a following section.

Description: Habitus slender. Snout rather acutely pointed, projecting well in front of lower jaw. Pupil horizontal. Tympanum, though distinct, is pigmented, suggesting that shrinkage in preservative might account for the prominence of the rim of the tympanic aperture. A slight supra-tympanic fold.

Skin smooth on the back of the adult Aramia River female, but the juvenile from Lake Murray has a series of very low, discontinuous dorso-lateral folds. Several low, rounded tubercles over each eye. Skin of throat smooth, that of belly coarsely granular. No pectoral fold. Limbs with smooth skin.

Finger discs well-developed, wider than long. Fingers without a trace of webbing. Fingers in order of length 3, 4, 2, 1. Subarticular tubercles moderately developed.

Hindlimb relatively long and slender. Toe discs well-developed, about same size as those on fingers. Heel of adpressed hind limb reaches to between the eye and tip of snout. Toes with well-developed webbing, the latter scarcely reaching beyond the distal subarticular tubercle of any digit. Toes with distinct fringes to discs. Subarticular tubercles moderately developed. A prominent inner metatarsal tubercle. Outer metatarsals united, the proximal of a series of small metatarsal tubercles under the fourth metatarsal constituting what might be considered as a small outer metatarsal tubercle.

Vomerine teeth present in the adult female from the Aramia River as two small but prominent round projections between the large, oval choanae; vomerine elevations are not visible in the juvenile from Lake Murray. Tongue oval, about one-third free behind.

Colour of adult female rich brown above except for a broad band of darker brown on each side extending from above each eye, dorso-laterally, to about half-way along the flanks. This results in the impression of a broad, lighter-coloured vertebral band. The chromatophores of the dorsal surface are not uniformly distributed, resulting in a slightly mottled appearance. A dark brown stripe commences above the tympanum and follows the supra-tympanic fold over the base of the forelimb. Anterior lateral surfaces dark brown, posterior lateral surfaces and groin whitish with a few scattered brown flecks. Upper jaw mottled with light and dark brown, an oblique dark bar or patch extending forward from beneath the eye to the mouth. An indistinct dark brown bar along the anterior edge of the basal part of the forelimb. A dark band along the hind edge of the forelimb below which, on the forearm, is a series of three or four white spots. Hind edge of thighs light brown flecked with white. Remaining dorsal surfaces of limbs mottled with light and dark brown. Ventral surfaces white, strongly peppered with brown on the throat, chest, anterior abdominal region and limbs. Rim of lower jaw rich brown.

The juvenile female is lighter in colour than the adult, being light grey above with irregular dark mottling. A slightly darker region between the eyes results in a light triangular patch bounded by the canthus on either side and a line between the anterior corners of the eyes. The dark, dorso-lateral patches of the adult are absent, but the dark bar from above the tympanum to the flank is conspicuous, as is the dark patch between the eye and the mouth. Each of the low, discontinuous dorso-lateral folds is bordered below by a dark brown patch. The upper surfaces of the limbs are light grey uniformly peppered with brown. The ventral surfaces are white, lightly but fairly uniformly peppered with brown.

A new subspecies from Australia is described below.

HYLA DORSALIS MICROBELOS, SUBSP. NOV.

(Plate XII and text-fig. 1)

Holotype: A male, R25836 in the Australian Museum, Sydney. From Cairns, Queensland, collected by Mrs. N. Morris in February, 1965.

Paratypes: Two males, R25837 and R25839 (the latter prepared as an alizarin skeletal transparency), and a female, R25838, in the Australian Museum. All with the same data as holotype.

Diagnosis: *Hyla dorsalis microbelos* may be distinguished from the nominate race by the absence of vomerine teeth in adult specimens and by its reduced ventral pigmentation. In *dorsalis dorsalis* the brown of the ventral surface is distributed more or less uniformly over the throat and chest. In *dorsalis microbelos* the ventral pigmentation is concentrated around the lower jaw, the centre of the chest and on the hind limbs.

Hyla dorsalis microbelos may be distinguished from *Hyla bicolor*, the only other Australian *Hyla* lacking vomerine teeth (Copland, 1957) by the following features: (a) an E-N/IN ratio exceeding 1.15 (an average of 0.92, range 0.81-1.07 in a series of twenty-seven *bicolor* from Australia and New Guinea), (b) the absence of a pectoral fold in life (at least one strong pectoral fold in *bicolor*), (c) the variegated brown dorsal colour (typically green in *bicolor*, though occasionally uniform brown), (d) the tubercles on the dorsum (smooth dorsum in *bicolor*) and (e) the webbing between the toes (fig. 1) never reaching beyond the distal subarticular tubercle of any digit (the webbing in *bicolor* reaches the level of the intercalary cartilage of the first, second, third and fifth toes).

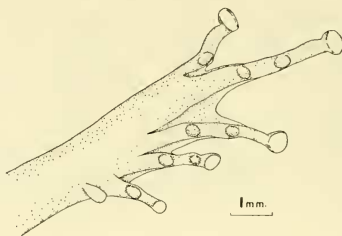


Fig. 1: Lower surface of foot of holotype of *Hyla dorsalis microbelos*.

Of the Australian species of *Hyla* with vomerine teeth, *H. dorsalis microbelos* (in which vomerine teeth are lacking) most closely resembles the so-called "ground hylas" of Moore (1961), all of which are at least two and a half times as long as *dorsalis microbelos* when mature and all of which possess a small outer metatarsal tubercle. The latter is absent in *dorsalis microbelos*.

Description of Holotype: Habitus very slender. Snout-vent length 17.2 mm. Snout rather acutely pointed, projecting well in front of lower jaw. Diameter of eye (maximum, horizontal) 2.00 mm. Pupil horizontal. Distance from anterior corner of eye to centre of naris (E-N) 1.85 mm. Internarial distance (IN) 1.54 mm. Tympanum covered with skin but rim of tympanic aperture clearly distinguishable, its diameter 1.00 mm. No supratympanic fold. Distance from posterior edge of tympanum to tip of snout 4.81 mm.

A discontinuous dorso-lateral fold made up of a series of low tubercles or short folds; a few low, rounded tubercles along the sides (below the dorso-lateral folds) and above each eye. Skin of remaining dorsal surfaces smooth. Skin of throat smooth, that of belly coarsely granular. No pectoral fold. Limbs with smooth skin.

Finger discs well-developed, wider than long; width of disc of third finger 0.58 mm. (58% of diameter of tympanum). Fingers with hardly a trace of webbing. Fingers in order of length 3, 4, 2, 1. Subarticular tubercles moderately developed.

Hindlimb relatively long and slender; tibia length 8.66 mm. Toe discs well-developed, slightly larger than those on fingers; width of disc of fourth toe 0.65 mm. (65% of diameter of tympanum). Heel of adpressed hind limb reaches to about the centre of the eye. Toes with well developed webbing, roughly 50%; webbing does not reach beyond the distal subarticular tubercle of any digit. Toes with hardly discernible fringes to discs. Subarticular tubercles moderately developed. A prominent inner metatarsal tubercle; no outer tubercle.

Vomerine elevations absent. Tongue sub-circular, about one-third free behind. A prominent external vocal sac; its openings in the floor of the mouth are longitudinal slits, one on each side lying below the lateral edge of the tongue.

Cream-coloured above with numerous dark brown chromatophores which sometimes coalesce to give a peppered appearance. Larger groups of chromatophores give a mottled appearance on the snout, head and nape. A definite, though poorly-defined, dark brown stripe runs from the nostril along the canthus to the eye. A broader dark brown band from the eye, through the tympanum (although the tympanum itself is lighter) and over the base of the forelimb to about half-way along the flank. A distinctive short, dark brown bar along the anterior edge of the basal part of the forelimb, just extending on to the elbow, and discontinuous with a similar bar on the hind edge of the distal part of the forelimb. An indefinite darker brown band along the anterior edge of the hindlimb. Upper (exposed) surfaces of limbs strongly peppered with brown, the latter sometimes coalescing to form faint mottling, especially on the fore and hind sides of the thighs. Ventral surface and concealed (resting) surfaces of limbs immaculate white, except for very fine peppering on the infralabial region, the lower surfaces of the hindlimbs and the chest, and heavy brown spotting on the lower surfaces of the hands and feet.

Variation: The paratypes differ from the holotype only in size. The female which, of course, lacks a gular sac, is significantly larger. The dimensions in mm. of the paratypes are given in Table 1 below.

The female paratype died in captivity and was preserved some hours after death. Although some decomposition had occurred, the ovaries were enlarged and mature, containing large numbers of small, darkly pigmented eggs. The testes of the male paratype are small, but those of the holotype are large (2.0 mm. in length) and apparently mature. Hence it is assumed that the snout-vent lengths of the four specimens obtained approximate average adult size.

Distribution: Known only from the type locality, Cairns, Queensland.

Habitat: Mrs. Morris states that with the exception of the female which entered a house during rain, all specimens were collected ". . . in a thicket of reeds about four feet high . . . in a gutter opposite the playing fields in Cairns." They were found only during rainy weather and were located by their calls. The males, according to Mrs. Morris, ". . . have a large transparent vocal sac and make an incredible amount of noise for such a small animal." The call of the male in breeding chorus ". . . is like that made by those grasshoppers which have leaf-shaped wings (presumably members of the orthopteran family Tettigoniidae—H.G.C.) and is every bit as penetrating."

The subspecific name alludes to the acute, javelin-like appearance of this diminutive frog.

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Table 1: Dimensions in mm. of *Hyla dorsalis dorsalis* and paratypes of
Hyla dorsalis microbelos

	28389	R24248	R25838	R25837	R25839
Snout-vent length	19.8	12.7	20.15	17.9	17.3
Tibia length	10.6	6.8	10.08	9.3	8.9
Internarial distance	1.69	1.17	1.63	1.65	1.53
Eye-naris distance	2.09	1.50	2.15	2.00	1.95
Diameter of eye	2.24	1.75	2.22	2.00	2.10
Snout to posterior edge of tympanum	6.38	4.63	7.05	5.16	5.22
Diameter of tympanum	1.05	0.84	1.13	1.04	1.10
Width of disc of third finger	0.84	0.50	0.58	0.50	0.64
Width of disc of fourth toe	0.83	0.55	0.63	0.50	0.68

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Explanation of Plate XII

Hyla dorsalis microbelos subsp. nov.

- A. Photograph of living male.
 B. Dorsal view of holotype.
 C. Ventral view of holotype.

Photo: Author.

Photo: H. Hughes

BUDGERIGAR SURVEY

In connection with a research project investigating adaption of birds to the desert environment, I am making a survey of nomadic behaviour of the Budgerigar.

I would like to ask the help of any member who has personal records or knows of literature records of either (a) breeding congregations of these birds, i.e., more or less high density breeding associations surrounded mainly by areas of little or no breeding, or (b) large non-breeding flocks as occasionally seen at waterholes, in flight, etc.

I am aware of the time and effort required to search through personal records, but please do not hesitate to write, no matter how insignificant your information may seem. Each item is important in itself, as the sum total of many records may give clearer understanding of the pattern of movement as a whole in this species.

Eric Lindgren, Dept. of Zoology, University of W.A., Nedlands, W.A.